

DNA testing for scrapie eradication: better, faster, cheaper

by Michael P. Heaton, PhD

What is scrapie?

Scrapie is a transmissible degenerative brain disease in sheep. About 1 in 500 mature culled sheep in the U.S. have scrapie and the disease is always fatal. The signs of scrapie vary widely among individual animals and develop slowly. Signs include scraping and rubbing off wool, wasting, and loss of coordination.



Why is eradicating scrapie important?

Although scrapie is considered a rare disease, eradicating it is important because the American Sheep Industry Association estimates that scrapie costs U.S. producers between \$20 and \$25 million each year. Much of this cost is because scrapie hurts both domestic and export markets of sheep and sheep products.

What is the US Meat Animal Research Center (USMARC) doing to help?

DNA-based tests are able to identify which sheep are resistant or susceptible to scrapie. DNA testing and selective breeding for scrapie resistance is a key component of the National Scrapie Eradication Program. At the USMARC in Clay Center, Nebraska, about 5000 lambs are produced per year and scientists wanted a better, faster, and cheaper DNA test for scrapie-resistance in research and industry flocks



To accomplish this, they used a diverse group of hundreds of US sheep to discover new DNA sequence variation in, and around, the prion gene that affects scrapie susceptibility. Results from this population-based DNA sequencing approach were used to develop a rapid, low-cost, and accurate test that works well in sheep from around the country. Commercial DNA testing companies have adopted the USMARC scrapie test design and consequently five sheep can now be tested for the price of one.

To further increase the accuracy and reliability of testing, USMARC scientists have now identified a set of 23 sheep whose DNA represents just about every possible result a laboratory can get when testing for genetic resistance to scrapie. This DNA provides labs with a quick and easy way to verify the accuracy of their testing procedures. Quality DNA testing is essential for the American Sheep Industry to reach its goal of eradicating scrapie from our borders by 2010.



Scrapie eradication programs represent the first widespread use of DNA testing for livestock disease control. As scientists learn more about factors affecting animal health, DNA testing may be increasingly important for disease control.



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